Summary of NLO QCD studies of diffractive dijet photoproduction at EIC

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- Diffractive dijet photoproduction at EIC can help constrain proton diffractive PDFs and measure novel nuclear diffractive PDFs and effect of nuclear shadowing.

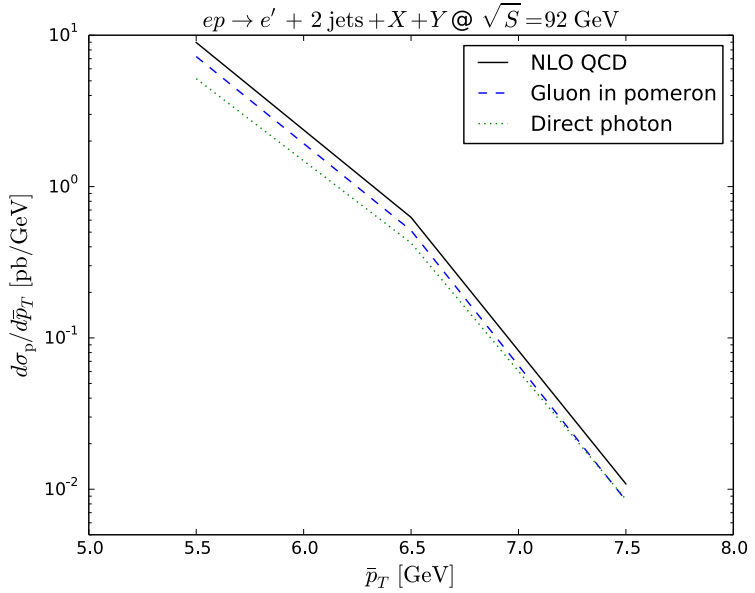
- In base EIC energy setting, our NLO pQCD approach predicts rates for $p_T < 8$ GeV, $x_\gamma > 0.5$, $|\Delta\eta| < 1.5$, $x_P > 0.01$, and $z_P > 0.4$.

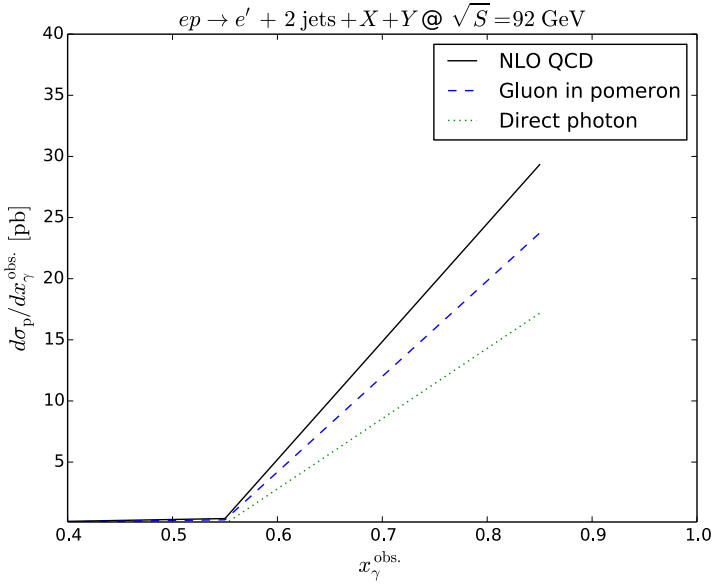
- At EIC, the dijet photoproduction cross section is dominated by the direct photon contribution and gluon diffractive PDF.

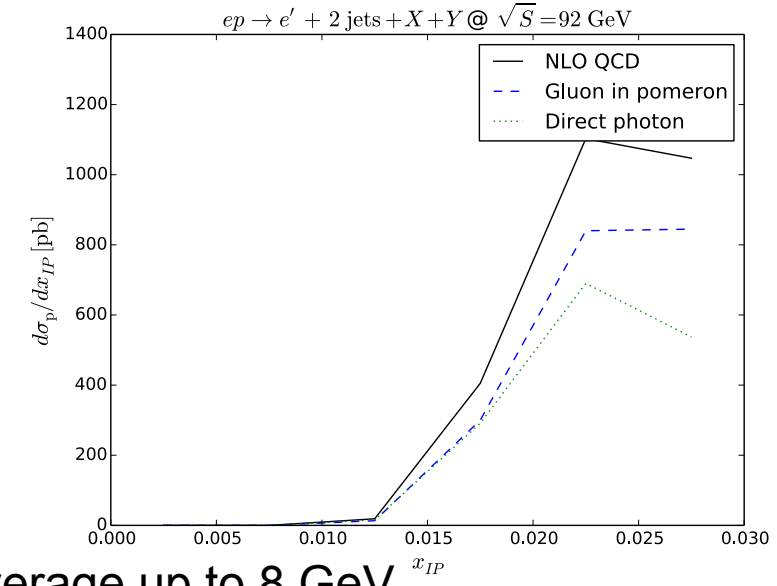
- This process can solve the problem of the mechanism/pattern of factorization breaking in diffractive DIS: global suppression vs. resolved-only.

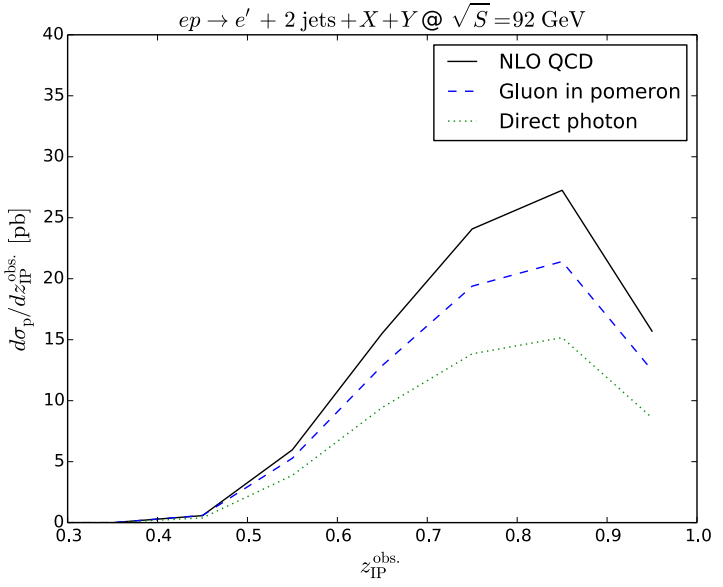
- For this, the most promising observable is x_γ dependence. To have wide coverage in x_γ, one needs the highest Ep and/or large range in x_P.

NLO QCD predictions for EIC



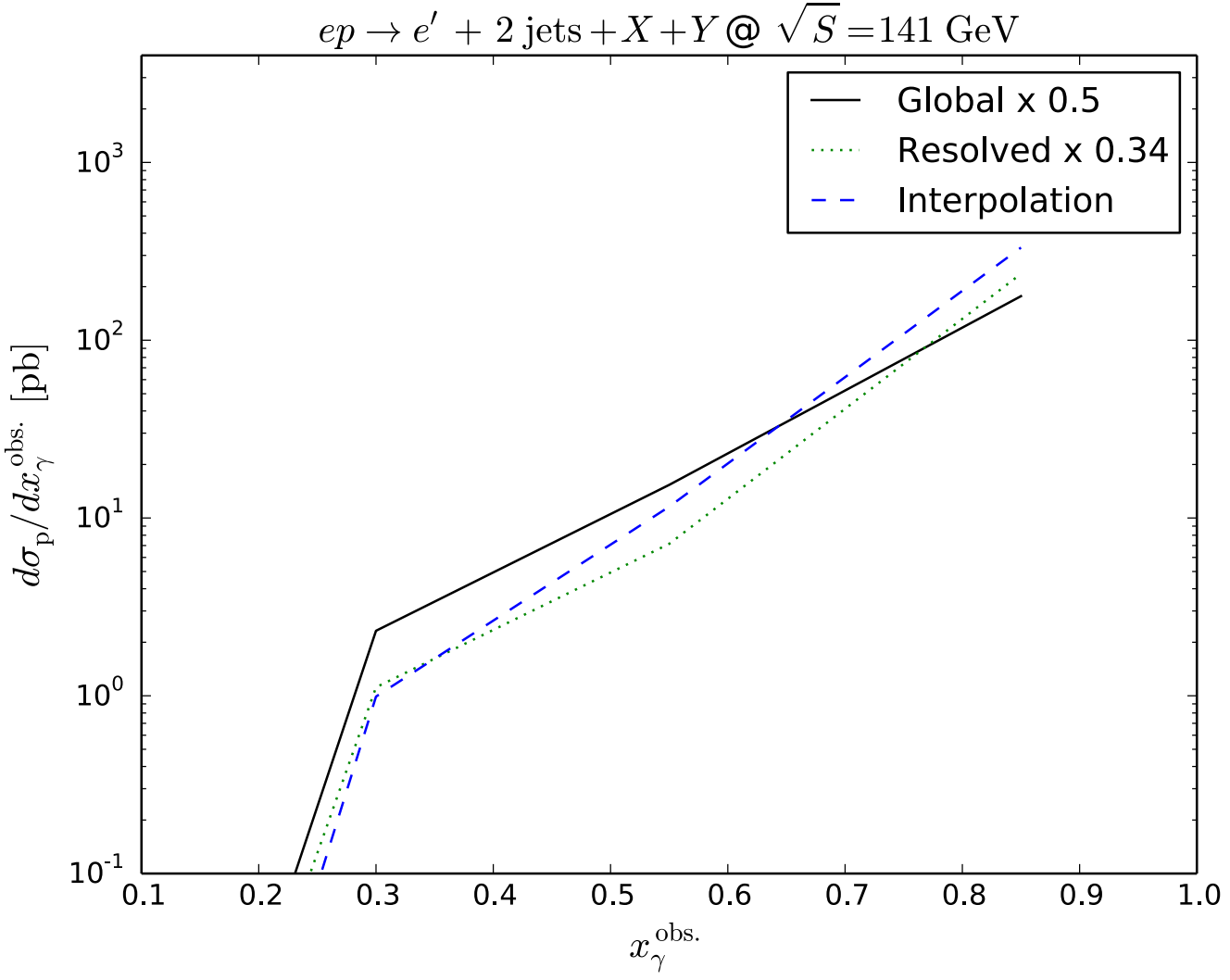






- Main features:
- $p_T = (p_{T1}+p_{T2})/2$ coverage up to 8 GeV
- dominated by direct photon contribution, i.e. large $x_\gamma > 0.5$ → challenging to address factorization breaking
- dominated by large x_P and z_P → probes mostly diffractive gluon density.

QCD predictions for EIC: factorization breaking



- Main features:

- Most promising observable is x_{γ} dependence → need wide coverage and high precision since the cross section drops.
- The rest of distributions differ mostly in normalization.

NLO QCD predictions for diffractive dijet photoproduction on nuclei at EIC